Supplementary Data for

Comparative and kinetic analysis of viral shedding and immunological responses in MERS patients representing a broad spectrum of disease severity

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Supplementary Fig. S1. Schematic diagram of epidemiological and clinical courses of MERS patients included in this study.

Supplementary Fig. S2. Determination of antibody titers of secretory IgA in respiratory samples. Since there were no negative samples, cut-off values (mean optical densities \pm 3 x S.D.) were determined by using the OD values of baselines (> 1: 6400 diluted samples).

Supplementary Fig. S3. Kinetic responses of cytokines in MERS patients. Kinetic responses of cytokines not included in Fig. 6 and showed significant upregulation in any of the clinical groups are presented. All these data values are included in Supplementary Table 3. The concentrations of the cytokines are presented in pg/ml. *: data point is out of x-axis range.

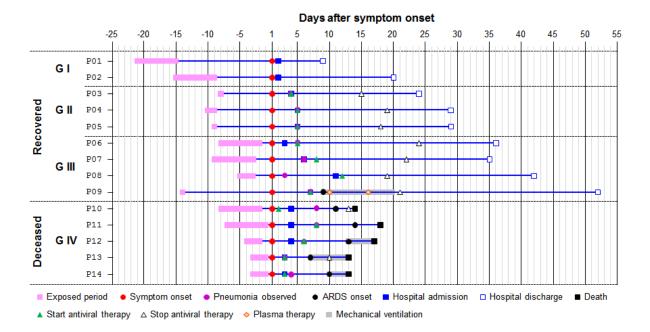
Supplementary Table S1. Laboratory data for fourteen MERS patients included in this study. Summary of data from each patient on admission and at acute phase.

Supplementary Table S2. Summary of anti-viral therapy applied to MERS patients.

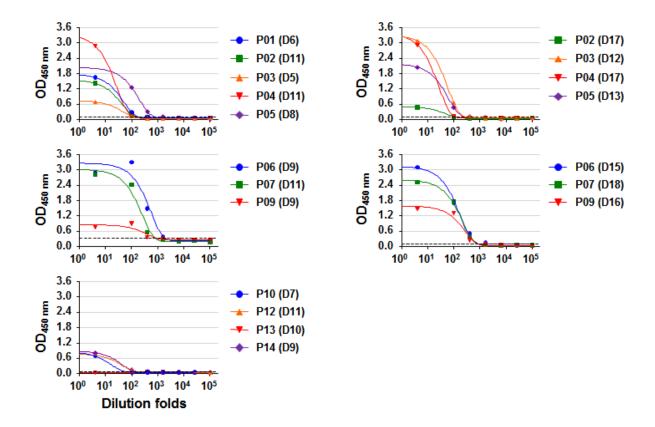
Supplementary Table S3. Kinetic changes in leukocyte and platelet counts in MERS patients.

Supplementary Table S4. Kinetic responses of 39 cytokines, chemokines, and growth factors in MERS patients.

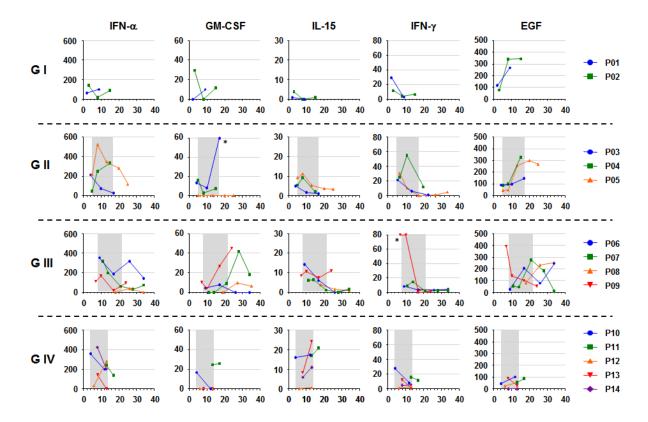
Supplementary Table S5. Hazards ratios and 95% confidence intervals of mortality according to the virological and immunological factors.



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Supplementary Table S1. Laboratory data for fourteen MERS patients included in this study. Summary of data from each patient on admission and at acute phase.

Group		Group			Group II	=				Croup III					Group IV	<u> </u>			
Patient's ID.	P01	P02 Av	erage	P03	P04	P05	Average	P06	P07	P08	P09	Average	P10	P11	P12	P13	P14	Average	
On admission	3	73		2	Ds	2		D ₃	D	D13	D7		2	D _S	2	D3	2		Normal range
Leucocyte (cells/µL)	4200	4900	4550	1800	4700	3400	3300	2240	2000	1910	4100	2563	3600	6740					3800 ~ 10000
Lymphocyte (cells/µL)	1200	1600	1400	800	1200	600	867	510	600	630	600								
Lymphocyte (%)	28.6	32.7	30.6	44.4	25.5	17.6	29.2	22.8	30.0	33.0	14.6				27.1				
Platelet (cells x 103/µL)	145	166	156	140	257	175	191	118	131	155	165								_
Hemoglobin (g/L)	138	127	133	136	117	126	126	129	120	132	115	124		121	143	120		120 126	
BUN (mg/dl)	10	18	14	5	00	5	0	9	12	12	13			17					
Cr (mg/dl)	0.66	0.56	0.61	0.45	0.49	0.56	0.50	0.67	0.67	0.77	0.56			0.97					
Albumin (g/dL)	3.6	3.5	3.6	3.9	3.1	3.1	3.4	3.3	3.5	3.1	2.6	2	3.4	2.3	2.6	2.8		2.5 2.7	
CRP (mg/dl)	0.5	2.7	1.6	0.5	15.1	4.7	6.8	3.6	0.7	1.5	16.9			3.4					
Procalcitonin (ng/mL)		1	_	0.05			0.05	0.05		0.34	0.89		í	0.74		,			
AST (IU/L)	27	13	20	16	25	105	49	42	52	231	<u>~</u>		27	170					
ALT (IU/L)	13	12	ಪ	10	16	68	31	16	25	129	15			28					
LDH (IU/L)	691	270	481	523	468	705	565	430	613	1587	530		384	368					2
Amylase (IU/L)	43	62	53	38	33	74	48	60	66	754	59			66		136			
Lipase (IU/L)	35	26	31	34	28	41	34	27	28	967	37		42	40					22 ~ 51
Proteinuria	1	trace			+	7			trace	Ψ	1		trace		1		+		
Arterial blood gas values																			
PH	ND*	ND		N	7.40	ND	7.40	7.40	ND	7.50	7.42			7.40				7.43 7.39	
pCO ₂ (mmHg)	ND	ND		N	36.0	ND	36.0	40.0	ND	26.0	28.0		ND	38.0				31.8	32.0 ~ 45.0
pO ₂ (mmHg)	ND	ND		ND	73.0	ND	73.0	92.0	ND	96.0	68.0		ND	87.0	74.0				75.0 ~ 100.0
HCO ₃ (mmol/L)	ND	ND		N	22.3	ND	22.3	24.8	ND	20.3	18.2		ND	24.0		16.6			19~24
O ₂ saturation (%)	ND	ND		ND	94.0	ND	94.0	97.0	ND	98.0	94.0			97.0					
Days after symptom onset				55	D8	28		5	D18	D19	76		D13	D18	D47	D13	D13		
Leucocyte (cells/µL)	N	ND		1600	5300	3700	3533	3000	1600	1400	8140	3535		13600				00 11300	
Lymphocyte (cells/µL)	ND	ND		600	900	400	633	500	200	500	400			400					
Lymphocyte (%)	ND	ND		37.5	17.0	10.8	21.8	16.7	12.5	35.7	4.9	17.4	3.6	2.9	4.3			1.0 2.6	
Platelet (cells x 10 ³ /µL)	ND	ND		140	322	228	230	88	81	163	346			66		74		94 84	
Hemoglobin (g/L)	ND	N		136	114	116	122	131	114	134	114		128	113	130				
BUN (mg/dl)	ND	B		5	6	6	6	=	00	12	0	9	14	5					
Cr (mg/dl)	N	ND		0.45	0.49	0.58	0.51	0.68	0.60	0.65	0.57			1.34					
Albumin (g/dL)	ND	ND		3.8	3.1	2.8	3.2	2.7	3.0	3.1	3.0		2.3	2.8	2.1	2.5		2.9 2.5	
CRP (mg/dl)	ND	ND		0.5	9.6	9.8	6.6	2.1	1.2	1.0	8.1			13.4					
Procalcitonin (ng/mL)	5 8	8			-	,	3	,	,	-	56	56	,	,	,	,	1		
AST (IU/L)	5 8	3 3		1 1	14	55 79	27	74	30	137	90			14	13 39	60 %		34 35	
LDH (IU/L)	8 8	N i		384	448	786	539	1076	400	1844	596		1003	1054					
Amylase (IU/L)	N	ND		41	37	108	62	53	59	715	76			279					-1
Lipase (IU/L)	ND	ND		42	32	69	48	36	32	844	48	240		179					
Proteinuria	1			1		7		3+	+	3+	2+			2+	2+	+	+		
Arterial blood gas values																			
pΗ	ND	ND		N	N	7.41	7.41	7.41	ND	7.50	7.43	7.45							ان ا
pCO ₂ (mmHg)	ND	ND		N	N	33.0	33.0	23.3	ND	26.0	13.0	20.8		67.0		95.0			
pO ₂ (mmHg)	ND	ND		N	N	75.0	75.0	84.0	ND	96.0	71.0								
HCO ₃ (mmol/L)	ND	ND		N	N	21.9	21.9	22.2	ND	20.3	19.5	20.7	20.2	20.3	38.5	28.2		22.0 25.8	
O ₂ saturation (%)	N	ND		ND	ND	95.0	95.0	96.0	ND	98.0	95.0								
of contamon (10)			_			00.0	00.0	00:0		00.0	00.0								

Anti-viral							Par	Patient's ID.						
illicially	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14
Pegylated IFN-α	1	1	D4*, D11	D6, D13	D5, D12	D4*, D11 D6, D13 D5, D12 D5, D12, D19 D8, D15 D12, D19 D7, D14	D8, D15	D12, D19	D7, D14	D9	D8, D15	D8, D15 D6, D13 D3, D10 D4, D10	D3, D10	D4, D10
Ribavirin	1		D4 ~ D15	D6 ~ D18	D5 ~ D18	D5 ~ D24	D8 ~ D21	D8 ~ D21	D7 ~ D13	D4 ~ D13	D6 ~ D17	D6 ~ D17	D3 ~ D7	D3 ~ D1:
lopinavir/ritonavir			D4 ~ D15	D6 ~ D18 D5 ~ D18	D5 ~ D18	1	D8 ~ D13		D7 ~ D22	D4 ~ D13	D8 ~ D17	D4 ~ D13	D8 ~ D13	D8 ~ D1
Anti-viral plasma***		1	•			•			D10, D16	ı	1	1	1	
* Days after symptom onset. ** IFN-o2a (180 µg/week); Ribavirin (400 – 1200 mg, three times a day); lopinavir/ritonavir (400/100 mg PO every 12 h)	om onse)/week);	t. Ribaviri	in (400 – 1200	mg, three time	es a day); lop	inavir/ritonavir (4)	00/100 mg PO	every 12h)						

Supplementary Table S3. Kinetic changes in leukocyte and platelet counts in MERS patients.

ient's ID.	Days after symptom onse Hb (g/dl)	13.8	3 13.5	4	8 14.1									Normal rang 12 ~ 14	e						
	PLT (x 10 ³ /μl) WBC (/μl)	145 4200	159 4300	195 5100	305 7300									130 ~ 400 4000 ~ 1000							
P01	neutrophil (/μl) lymphocyte (/μl)	2356 1193 592	2498 1195 559	3284 1244	2132									1420 ~ 6340 710 ~ 4530 140 ~ 720	1						
	monocyte (/μl) neutrophils (%)	56.1	58.1	520 64.4	642 60.6									140 ~ 720							
	lymphocytes (%) monocytes (%)	28.4 14.1	27.8	24.4 10.2	29.2 8.8																
	Days after symptom onse Hb (g/dl)	t 2	3 13.4	4	5 12.9	6 12	7	8	9 12	12 13.5	15 12.6	17 12.1									
	PLT (x 10 ³ /μl) WBC (/μl)	166 4900	188 5200	201 5500	203 4700	223 4800	231 4500	262 5200	280 6000	312 7120	294 7000	280 5600									
P02	neutrophil (/µl) lymphocyte (/µl)	2818 1632	2980 1804	3427 1639	2491 1814	2554 1829	2448 1625	2881 1830	3600 1794	4286 2342	4767 1736	3517 1635									
	monocyte (/µl) neutrophils (%)	328 57.5	281	297	244	245	239	265 55.4	312	292	280	241									
	lymphocytes (%)	33.3	34.7	29.8	38.6 5.2	38.1 5.1	36.1 5.3	35.2 5.1	29.9	32.9 4.1	24.8	29.2									
	Days after symptom onse	it 4	5	6	7	8	9	10	11	12	13	14	15	16	17	19					
	Hb (g/dl) PLT (x 10 ³ /μl)	13.6 140	13.8 128	13.6 123	13.3 134	13.1 160	13.4 201	12.9 230	12.4 278	12.4 331	12.1 399	12.8 427	12.9 440	12.3 456	12.7 493	11.7 428					
P03	WBC (/μl) neutrophil (/μl)	1800 839	1600 611	9900 8583	8220 6732	5300 4060	2700 1658	2700 1787	2400 1274	2200 1210	3700 2279	3500 2170	2900 1572	2800 1590	3200 1776	3000 1626					
	lymphocyte (/μl) monocyte (/μl)	803 148	846 130	1000 317	1192 288	954 265	772 251	581 302	732 346	755 165	858 463	816 448	902 377	893 269	1085 310	1092 243					
	neutrophils (%) lymphocytes (%)	46.6 44.6	38.2 52.9	86.7 10.1	81.9 14.5	76.6 18	61.4 28.6	66.2 21.5	53.1 30.5	55 34.3	61.6 23.2	62 23.3	54.2 31.1	56.8 31.9	55.5 33.9	54.2 36.4					
	monocytes (%) Days after symptom onse	8.2 t 5	8.1	3.2	3.5	9	9.3	11.2	14.4	7.5	12.5	12.8	13 16	9.6	9.7	8.1	22	24			
	Hb (g/dl)	11.7 257	11.4 322	10.9 330	11.4 343	11.2 427	11.3 457	11.5 525	11.6 493	10.8	11.3 502	10.6 405	10.9 385	10.7 332	10.8 328	10.8 278	10.1 237	10.1 217			
	PLT (x 10 ³ /µl) WBC (/µl)	4700	5300	5200	6200	4600	4800	4000	3200	4300	4400	4100	4100	3600	4200	4000	3900	3600			
P04	neutrophil (/μl) lymphocyte (/μl)	3304 1161	3297 1489	3682 941	4737 980	2594 1490	2486 1819	1692 1844	966 1840	2189 1733	2270 1694	2189 1427	1193 2464	1202 2027	1256 2482	1300 2248	1299 2153	1040 2149			
	monocyte (/μl) neutrophils (%)	207 70.3	445 62.2	499 70.8	415 76.4	432 56.4	365 51.8	372 42.3	346 30.2	292 50.9	326 51.6	373 53.4	332 29.1	270 33.4	332 29.9	308 32.5	269 33.3	234 28.9			
	lymphocytes (%) monocytes (%)	24.7 4.4	28.1 8.4	18.1 9.6	15.8 6.7	32.4 9.4	37.9 7.6	46.1 9.3	57.5 10.8	40.3 6.8	38.5 7.4	34.8 9.1	60.1 8.1	56.3 7.5	59.1 7.9	56.2 7.7	55.2 6.9	59.7 6.5			
	Days after symptom onse Hb (g/dl)	t 5 12.6	11.7	7 11.6	8 11.6	9 12.6	10 12	11 12.2	12 11.8	13 11.5	14 11.6	15 12	16 11	17 11.6	18 10.6	20 10.7	22 10.8	24 9.8			
	PLT (x 10 ³ /µl) WBC (/µl)	175 3400	204 4400	228 3700	249 4400	289 4800	323 4000	371 3800	395 4350	401 3900	425 3800	458 2800	389 3300	330 2600	331 3100	400 3400	416 3400	368 3100			
P05	neutrophil (/µl) lymphocyte (/µl)	2615 561	3480 576	2738 692	3705 466	3917 552	3260 504	2820 657	2984 835	2968 445	2827 509	1722 633	2241 627	1342 660	880 1646	1309 1482	1649 1221	1553 1026			
	monocyte (/µl)	211	334	252	207	149	212	300	492	417	388	400	393	572	552	575	473	446			
	neutrophils (%) lymphocytes (%)	76.9 16.5	79.1 13.1	74 18.7	10.6	81.6 11.5	81.5 12.6	74.2 17.3	68.6 19.2	76.1 11.4	74.4 13.4	61.5 22.6	67.9 19	51.6 25.4	28.4 53.1	38.5 43.6	48.5 35.9	50.1 33.1			
	Days after symptom onse	6.2 t 4	7.6 5	6.8	7	8	5.3 9	7.9	11.3	10.7	10.2	14.3	11.9	16	17.8	16.9 20	13.9	24	27		
	Hb (g/dl) PLT (x 10 ³ /μl)	12.9 118	14 99	14 90	13.9 77	13.9 76	13.1	13.7	14.1 122	12.8	12.7	12.6 139	12.2	11.9 155	11.6 99	11 108	11 126	12.1	11.1 138		
P06	WBC (/μl) neutrophil (/μl)	2240 1496	2300 1424	1700 923	10000 9050	8700 8004	3000 2328	1400 720	14200 13618	10000 9190	4800 3898	2800 1814	2300 1463	3100 1721	1900 1032	1400 706	4800 3950	2400 1471	2800 1145		
P06	lymphocyte (/µl) monocyte (/µl)	511 159	688 184	559 213	620 330	513 174	468 189	494 165	525 43	630 150	566 322	566 398	481 338	694 636	496 340	374 301	379 461	410 494	1014 468		
	neutrophils (%) lymphocytes (%)	66.8 22.8	61.9	54.3	90.5	92	77.6 15.6	51.4	95.9 3.7	91.9	81.2 11.8	64.8 20.2	63.6	55.5 22.4	54.3 26.1	50.4 26.7	82.3	61.3	40.9		
	monocytes (%) Days after symptom onse	7.1	8	12.5	3.3	2	6.3	11.8	0.3	1.5	6.7	14.2	14.7	20.5	17.9	21.5	9.6	20.6	16.7	20	
	Hb (g/dl)	12	11.3	11.4	11.4	11.9	12.6	12.8	11.3	12.8	13.6	10.9	10.1	9.5	8.1	10.2	10.4	11.5	10.9	11.4	1
	PLT (x 10 ³ /µl) WBC (/µl)	131 2000	83 1600	81 1600	88 1600	100 1700	126 1500	138 2400	117 1800	106 1900	120 1600	187 2700	211	251 2080	315 1600	377 1900	417 2400	419 2300	358 2400	311 2500	23
P07	neutrophil (/μl) lymphocyte (/μl)	1208 642	779 691	846 638	981 533	1000 564	948 489	1843 434	1354 335	1549 207	1245 240	2138 397	1757 382	1387 437	707 626	874 661	1027 876	906 1026	986 1061	1233 903	10
	monocyte (/µI) neutrophils (%)	150 60.4	118 48.7	107 52.9	80 61.3	128 58.8	60 63.2	120 76.8	106 75.2	143 81.5	110 77.8	159 79.2	147 76.4	227 66.7	240 44.2	327 46	439 42.8	331 39.4	326 41.1	298 49.3	4
	lymphocytes (%) monocytes (%)	32.1 7.5	43.2 7.4	39.9 6.7	33.3	33.2 7.5	32.6	18.1	18.6 5.9	10.9 7.5	15 6.9	14.7 5.9	16.6 6.4	21 10.9	39.1 15	34.8 17.2	36.5 18.3	44.6 14.4	44.2 13.6	36.1 11.9	4
	Days after symptom onse Hb (g/dl)		13 13.7	14 12.1	15 12.9	16 12.9	17 13	18 13.2	19 12.4	20 12.5	21 12.3	22 12.7	23 11.7	28 12.3						-	
	PLT (x 103/µl)	155	167	179	204	225	260	277	294	348	357	398	410	403							
P08	WBC (/μl) neutrophil (/μl)	1910 1117	7700 6691	9300 8351	6200 5134	5200 4118	7400 6098	9000 7200	9100 7398	8200 6396	8900 6880	7900 5878	5000 3270	5200 3401							
	lymphocyte (/μl) monocyte (/μl)	623 166	747 262	632 307	670 391	614 442	614 659	837 909	683 974	689 1099	1015 970	1122 869	1160 540	1399 281							
	neutrophils (%) lymphocytes (%)	58.5 32.6	86.9 9.7	89.8 6.8	82.8 10.8	79.2 11.8	82.4 8.3	9.3	81.3 7.5	78 8.4	77.3 11.4	74.4 14.2	65.4 23.2	65.4 26.9							
	monocytes (%) Days after symptom onse	8.7 t 7	3.4	3.3	6.3	8.5	8.9 12	10.1	10.7	13.4	10.9	11	10.8	5.4 19	20	22	24	26	28	31	-
	Hb (g/dl) PLT (x 10 ³ /μl)	11.5 165	9.9 157	9.8 177	15.4 85	13.6 81	12.9 62	12.8 68	12.3 70	12 73	8.4 134	11.2 121	10.4 146	9.8 114	11.5 133	10.4 198	9.2 190	8.4 195	9.7 203	8.9 157	
	WBC (/μl) neutrophil (/μl)	4100 3395	4600 3689	4430 3367	6400 5126	7800 6248	6100 4721	7000 5943	9000 7218	15000 12900	15700 12968	14200 11516	14200 11658	11600 10452	12600 10710	13800	11200 8994	10300 7251	10600 7961	7970 5212	67
P09	lymphocyte (/µl)	631	787	820	992	1014	604	448	621	600	1743	1420	1108	615	832	1076	1075	1494	1367	1347	13
	monocyte (/µl) neutrophils (%)	57 82.8	110 80.2	235 76	243 80.1	460 80.1	77.4	518 84.9	1035 80.2	1440 86	926 82.6	1221 81.1	1363 82.1	487 90.1	1021 85	1794 79	918 80.3	1123 70.4	954 75.1	271 65.4	6
	lymphocytes (%) monocytes (%)	15.4 1.4	17.1 2.4	18.5 5.3	15.5 3.8	13 5.9	9.9 10.4	6.4 7.4	6.9 11.5	9.6	11.1 5.9	10 8.6	7.8 9.6	5.3 4.2	6.6 8.1	7.8 13	9.6 8.2	14.5 10.9	12.9 9	16.9 3.4	1
	Days after symptom onse Hb (g/dl)	t 4 12.8	5 13.8	14.1	7 14.3	14.3	12.8	10 12.6	11 12.5	12 12.5	13										
	PLT (x 10 ³ /μl) WBC (/μl)	135 3600	140 4200	112 4500	108 5100	119 7300	113 8200	125 6000	138 4000	145 4200	146 5600										
P10	neutrophil (/μl) lymphocyte (/μl)	2365 842	2478 1365	3497 698		6424 650	7724 303	5436 348	3524 244	3583 281	4878 381										
	monocyte (/μl)	364 65.7	336	288	245 84.4	226 88	172 94.2	210	224	328 85.3	342 87.1										
	neutrophils (%) lymphocytes (%)	23.4	32.5	15.5	10.4	8.9	3.7	5.8	6.1	6.7	6.8										
	monocytes (%) Days after symptom onse	10.1 t 5	6	6.4 7	4.8 8	3.1 9	10	3.5	5.6 12	7.8	6.1	15	16	17							
	Hb (g/dl) PLT (x 10 ³ /μl)	12.1 233	11.7 183	12.6 166	12.4 141	14.2 144	11.7 124	12.8 132	12.4 127	12.6 118	11.9 136	10.9 98	11.2 88	11.3 74							
	WBC (/μl) neutrophil (/μl)	6740 4671	5000 3600	4600 3137		4500 2439	3800 2595	3900 2668	4700 3431	5800 4472	6200 5034	5200 4316	5900 4773	8500 7293							
P11	lymphocyte (/µl) monocyte (/µl)	1186 816	775 605	837 589	1284 652	1553 504	749 429	800 410	832 428	870 458	601 552	411 468	779 336	799 332							
	neutrophils (%) lymphocytes (%)	69.3 17.6	72 15.5	68.2 18.2	60 26.2	54.2 34.5	68.3 19.7	68.4 20.5	73	77.1 15	81.2 9.7	83 7.9	80.9 13.2	85.8 9.4							
	monocytes (%)	12.1	12.1	12.8	13.3	11.2	11.3	10.5	9.1	7.9	8.9	9	5.7	3.9							
	Days after symptom onse Hb (g/dl)	14.3	15.5	14	14.9	15.3	15.4	14.1	13.8	15.4	14.9	12.6	12.9	12.1							
	PLT (x 10 ³ /µl) WBC (/µl)	184 7000	170 8500	134 7300	110 9500	110 8100	101 8300	94 5600	89 6500	99 10600	59 15600	108 18200	91 15700	39 9950							
212	neutrophil (/μl) lymphocyte (/μl)	3969 1911	4726 2635	5241 1409	7334 1710	5889 1337	5968 1569	3713 1338	4674 1118	7558 912	14399 499	16817 455	14130 612	8627 547							
	monocyte (/µI) neutrophils (%)	868 56.7	969 55.6	584 71.8	380 77.2	745 72.7	755 71.9	510 66.3	683 71.9	1049 71.3	686 92.3	910 92.4	895 90	766 86.7							
	lymphocytes (%) monocytes (%)	27.3 12.4	31 11.4	19.3	18	16.5	18.9	23.9	17.2 10.5	8.6 9.9	3.2 4.4	2.5	3.9 5.7	5.5 7.7							
	Days after symptom onse Hb (g/dl)		4	5	6	7	8	9	10 12.9	11 13.6	12	13 12.6	0.1								
	PLT (x 10 ³ /μl)	189	168	167	165	159	171	232	201	209	160	74									
P13	WBC (/μl) neutrophil (/μl)	5500 5236	7405	7019	4698	6100 5728	3800 2960	8600 6923	6100 5435	10500 9345	12200 10809	15800 15089									
-	lymphocyte (/μl) monocyte (/μl)	198 44	688 490	771 410	996 276	165 201	312 505	327 1342	165 500	210 945	232 1159	174 537									
	neutrophils (%) lymphocytes (%)	95.2 3.6	86.1 8	85.6 9.4	78.3 16.6	93.9 2.7	77.9 8.2	80.5 3.8	89.1 2.7	89 2	88.6 1.9	95.5 1.1									
	monocytes (%) Days after symptom onse	0.8 t 3	5.7	5	4.6	3.3 7	13.3	15.6	8.2	9	9.5	3.4									
	Hb (g/dl)	12 111	11 77	11.2 69	11.6 67	11.3	11.9 72	11.6 73	10 51	10 45	11.5										
	PLT (x 103/l)		1.0			3200	5900	8600	7400	9390	9800										
	PLT (x 10 ³ /µl) WBC (/µl) neutrophil (/µl)	8400		3300			5505	8024		0400											
P14	WBC (/μl) neutrophil (/μl) lymphocyte (/μl)	8400 8072 277	4560 365	2802 383	1879 422	3011 170	5505 307	8024 387	7089 207	9108 207	9633 59										
P14	WBC (/μl) neutrophil (/μl)	8400 8072	4560	2802	1879	3011															

Supplementary Table S4. Kinetic responses of 39 cytokines, chemokines, and growth factors in MERS patients.

		De	eceas	sed	ı																	F	Rev	erec	1														Groups
P14		P13	P12		3		P10				P09			P08					P07				P06				3	000		P04			P03			P02		P01	<u>-</u>
3 8	13	000	14 6		3 23	12	4	24	17	10	7	34	26	18	34	28	21	14	#	34	26	17	9	25	20	13		10		Ø	17	10	4	16	60	3	ω 1	2	Days after symptom onset IFN-a2 Fit-3L G-CS
425.1 205.6	0.0	145.3	281.7	2 0	139 2	200.9	362.7	98.7	18.5	168.7	112.0	0.0	35.7	0.0	72.6	29.8	60.9	198.1	320.1	139.9	318.8	187.8	354.3	115.5	280.7	348.7	522.2	218.2	248./	48.9	28.4	73.9	212.9	90.8	18.5	142.3	100.2	61.9	IFN-a2
0.0	0.0	0.0	0.0	0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	7.4	0.0	17.1	0.0	0.0	0.0	0.0	0.0	3.2	FIL-3L
20.5	1086.0	20.9	0.0	900	58.7	110.1	68.7	15.5	0.0	49.2	124.7	2.3	15.5	0.0	0.0	36.2	8.2	38.0	33.6	7.6	0.0	41.9	102.2	15.1	8.9	2.7	28.2	410	3.9	13.6	123.6	30.0	52.9	26.4	3.9	72.2	22.3	26.4	G-CSF
0.0	0.0	0.0	0.0	0.00	24.7	0.0	16.9	45.3	26.5	4.0	10.1	6.4	9.9	0.0	18.3	42.0	9.0	0.0	0.0	0.0	0.0	7.5	4.5	0.0	0.0	0.0	0.0	0.0	2.9	16.3	183.1	8.2	13.6	11.6	0.0	29.5	9.9	0.0	GM-CSF
0.0	0.0	0.0	0.0	9	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	E E
0.0	П	-1	188.3	373	7.6		47.9 1	12.6	0.0	137.7	124.9	6.8	26.4	79.1	2.0	10.2	8.0	33.6	3.2	30.5	20.0	6.5	23.1	4.7	3.7	3.7	35.1	420	ľ		8.4	3.2	9.2 1			_	14.0	-	IL-1RA IL-1a IL-1B
7.3			46.1	3	25.0	22.7	141.3	0.0	0.0	10.5	78.9	0.0	8.3	0.0	0.0	0.0 48	0.0	0.0	0.0	0.0	0.0	0.0	17.1	53.6	0.0	0.0		15.0	ľ		0.0	80.1	10.2		-			_	IL-1a IL-1B
0.0 18.0			0.0 11.4		5.2 7.3	0.0 46.	2.0 26.	0.0 24.	0.0 13.7	0.0 66	0.0 47.	34.	0.0 25.	0.0 59	0.0 27.0	5.4 230	0.0 26.	0.0 35	0.0 43	10.7 69			0.0 43.	0.0 32.	0.0 31			0.0 25.4			1.0 148	2.6 20.	2.2 19.				7.0 25.9	~	β TNF-α
.0 6.3		٦	4 99.6		3 103.	58.2	6 11.9	.1 23.1	.7 3.9	1 222.	.0 298	9	.9 0.0	.6	.0 7.	.9 1323	3 4	.5 50.0	.6 33.2	74	On	2 83.9	1 46.6	.3 0.0	4 4	.7 9.	on I	40 6		ω .	.9 2315.	.1 26.	.7 11.9	_	2	_	9 0.0	٦	1 L-6
3 17.4			.6 236.4	1	4 27.0	1		.1 36.9	.9 109.7	.2 47.6	.6 80.3	Ī	.0 1.5	.0 8.9	.1 10.6	3.3	.1 6.5	.0 50.7	.2 22.2	~	.6 0.0	_	6 12.1	.0 21.7	2	_		6 46 5			0.0	.6 3.3	.9 8.4	ľ	-			١	F-10
0.0	3.2	19.2	25.7	3 6	15.6	21.7	86.4	19.8	140.1	29.8	29.9		2754.1	9258.1	0.0	70.4		1931.3	9.2				736.9	152.4	80.0	79.4		108.3			89.8	52.6			_			- 1	TGF-β
								Ĩ			Ī					Ī	Ī			Ì	Ī																		Fractalkine
0.0			0.0	r	51.3	_	423.4		0.0	256.0 7	58.3	_	204.2	0.0	0.0	72.2 2	44.2	0.0		N	_		37.0 1	240.6	88.8	0.0		0.00			0.0	192.6	254.3		0.0			~	- 1
733.6	768.0	699.0	721.2	7	913.8	156.0	814.3	669.5	546.8	811.0	446.0	997.0	220.8	250.2	777.2	034.0 1	627.3	139.0	1127.0	148.0		380.3	489.0	906.3	996.5	737.8	734.9	647 6	304.9	278.2	818.0 1	350.2	531.9	469.9	388.0	521.4	518.8	843.4	MCP-1 MC
0.0	0.0	0.0	0.0		0.0	76.9	0.0	0.0	648.2	573.6 2	685.7 2	458.2	0.0	0.0	49.5	056.0	0.0	0.0	0.0	167.6	250.9	0.0	0.0	0.0	195.5	0.0	0.0	000	0.0	0.0	003.0	0.0	0.0	0.0	0.0	0.0		0.0	:P-3
8826.0	5149.0	2426.0	6424.0		0856.0	2353.0	0.8988	5280.0	729.5	3685.0	7260.0	1499.0	1709.0	3567.0	1754.0	1928.0	1371.0	7829.0	7745.0	1938.0	3048.0	3486.0	9006.0	7494.0	6771.0	2832.0	1365.0	4209.0	0.80	1528.0	972.6	945.7	2422.0	504.1	767.6	1505.0	464.4	2373.0	-10
152.9	174.8	307.2	313.0		598.7	378.9	472.7	85.8	111.3	270.9	382.9	376.6	660.8	667.0	338.8	468.8	375.6	381.0	518.9	574.3	321.3	405.4	438.2	818.9	381.0	218.5	340.8	505.7	422.1	561.0	440.6	465.4	460.6	340.3	273.2	323.1	247.0	242.7	MDC R
3.6	18.1	13.5	19.8	40.0	20.6	27.5	16.7	5.9	21.2	18.4	17.5	31.4	42.2	24.5	3.3	25.4	33.2	10.7	12.5	33.3	20.8	42.8	17.7	32.0	34.9	40.9	19.3	21.6	2.71	9.0	32.4	30.0	25.4	32.8	43.4	29.1	42.4	33.2	ANTES
45.1	285.6	48.7	165.0	277	234.5	36.1	16.7	102.9	2416.0	254.7	181.0	4098.0	12.2	25.6	265.0	4872.0	33.2	18.5	23.8	3537.0	585.6	40.2	51.4	160.0	919.5	41.3	28.5	16.3	15.5	10.9	5764.0	56.8	8.1	170.8	12.1	7.4	145.7	34.7	=
0.0	42.1	0.0	0.0		10.3	27.0	13.8	9.3	43.3	48.8	49.9	311.	8.6	14.4	67.0	1931	0.0	0.0	0.0	280.1	94.0	5.8	28.2	21.8	16.5	12.3	0.0	110.0	0.0	0.0	643.	18.8	7.1	144.3	9.7	18.2	35.2	0.0	MIP-1a
	16								Ī	Ĭ	Ī	1 23	6 49			135.				1 36	_				_	3 42					.3 25	8 44.		_				0	MIP-
0.0 14	Γ.		12.3 21		12.5 26			22.2 46	35.0 23	62.0 88	58.5 48	1.3 22	œ	48.5	39.4 29	-	0.0	0.0	21.9	31		31.7	49.9 21	97.2 33	o	_	on 1	0	4 4	. თ	0.1 29	4	40.0 20	GS.	_			ω	1β Eota
144.9	_		216.0 1		269.8	=		468.4 3	Ŭ	853.1 15	487.7 15	224.0 15	87.3 15		295.5	309.7 2	20.9 1	91.8	87.8				218.1		372.3	=		96.7			299.1 15		204.9 12	П	244.7		290.0 91		taxin GF
673.3	0	œ	1048.0	9	743.0	•	1095.0	3227.0	4922.0	136.0	136.0	136.0	136.0	1899.0	999.4	2485.0	1192.0	602.2	973.5	•	0	0	877.0	5273.0	136.0	6	00 6	1256.0	1108.0	2	136.0	2077.0	559.0	3091.0	6	1479.0	20	o	GRO II.
0.0 0.0	0.0		0.0	- 11	4.2 3.3								0.0 5.0		0.0	11.0	0.0 4.2		0.0		0.0			0.0 6.5			0.0	- 1	0.0		11.3	0.0 10.6	0.0 13.1	0.0 4.8	0.0 3.6	0.0 9.7		0.0 3.8	IL-2 IL-7 IL-
6.0			0.6		17.1	17.3		11.0	7.5	10.6	8.6	8.0	1.5	3.9	1.6	0.0	1		6.1				14.2	3.3	3.7			9.0		5.5	11	1.00	4.9	8.0	0.0	3.9	0.0	0.9	II-16
0.0	0.0	0.0	0.0	9	0.0	0.0	3.6	0.0	0.0	0.0	0.1	0.0	0.5	0.0	1	0.2	0.9	0.0	0.1	0.2	0.0	0.9	0.1	1	0.5	0.0	0.0	2	0.0	3.0	0.1	2.4	4.3	6.3	0.9	11.9	i i	0.0	IL-12p70 IL
0.0	0.0	0.0	0.0	9	14.2	0.0	6.7	0.0	0.0	0.0	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0	9 .	0.0	0.0	0.0	6.4	0.0	0.0	30.6	0.0	0.0	-12p40
4.9	0.0				16.0			ī	0.0	164.0	337.7	3.3	3.3	3.9	2.4	2.5	1.6	14.6	9.3	4.0	3.0	3.5	8.4	4.9	1.0	0.0	10.1	30.5	9 6	25.2	ī	6.6	21.6					29.2	FN-y =
	0.0 0.0				0.0			0.0	0.0 0.0	0.0 0.	0.0 1.	0.0 0.0	0.0 0.0	0.0 2.	0.0 0.0	0.0 0.0	0.0 1.	0.0 0.0	0.0 0.0	0.0 0.0	0.0		0.0 0.0	3.4 1.	0.0 0.0	_		0.0		0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	Г	0.0 0.0		0.0 0.0	0.0	-
0.0			0.0		0.0		0 1.0	0.0	0.0	0 1.7	5 2.5		0.0	.3 0.0	.0 0.0	0.0	.0 0.0	_	.0 0.0		0.0	_	0 1.1	.2 0.0	0.0			0 0			.0 0.0	.0 0.0	0.0		.0 0.0				5 IL-9
1.5	0.0	0.0	0.0		4.9	0.0	2.6	0.0	1.5	0.0	2.2	1.4	0.0	0.0	3.3	3.6	0.0	2.8	4.6	23.4	15.4	15.6	16.1	0.0	0.0	0.0	0.0	0 0	0.0	8.4	0.0	1.2	1.7	2.8	2.8	3.9	0.0	0.0	IL-17A
167.8	728.0	2045.0	1414.0	2000	422.9	1968.0	668.5	440.8	1211.0	1396.0	4226.0	7196.0	5406.0	2781.0	263.3	1843.0	2540.0	1334.0	800.9	7588.0	1629.0	5588.0	1754.0	3814.0	4500.0	6222.0	1675.0	1117.0	1910.0	326.8	2291.0	4453.0	2412.0	3792.0	7382.0	1090.0	4636.0	3742.0	SCD40L
	10.0	3.8	4.2	70	9.5	3.9	4.7	36.0	48.8	17.4	29.4	12.0	3.3	22.0	17.8	1,4	0.3	2.7	0.2	1.0	1.5	1.0	0.2	0.7	0.5	3.2	5.80	1 0.0	8.1	3.5	0.8	2.7	1.7	4.2	0.9	2.9	6.9	0.7	TGF-a EGF
0.0	29.0	91.3	57.7	2 2 2	54.3			54.2	99.6	142.0	392.4	254.9	233.6	79.9	9.6	181.7	276.3	44.2	52.9	245.7		206.4	26.9	267.2	299.8	258.6	47.5	45.3	100.4	89.7	148.2	99.7	90.5		341.8			ω	Ţ.
0.0	0.0	0.0	31.9	0 0	56.0	122.2		0.0	0.0	0.0	20.6	62.0	145.3	43.2	0.0	12.6	148.5	0.0	19.1	47.7	26.0	137.7	45.0	24.8	0.0	99.1	0.0	0.0	0.0	45.0	17.4	114.2	131.8	111.3	31.9	148.5	120.7	63.4	:GF-2 V
0.0	0.0	1022.0	0.0	9 6	127.0	651.6	331.9	0.0	0.0	696.4	920.9	86.0	215.5	0.0	0.0	192.2	263.6	0.0	0.0	538.8	237.1	818.9	399.7	79.7	145.1	232.9	0.0	0 0	9 9	0.0	79.7	127.0	172.2	467.5	368.7	509.7	249.4	0.0	EGF

Supplementary Table S5. Hazards ratios and 95% confidence intervals of mortality according to the virological and immunological factors. If HR > 1.1 in red, < 0.9 in blue.

model	A.	crude, sin	ce exposed		B. ag	e-adjusted,	since expos	sed
variable	HR	95%	CI	p value	HR	95%	CI	p value
resp_virus	1.0890	0.7969	1.4881	0.5930	0.9767	0.7372	1.2938	0.8690
plasma_virus	2.9895	0.4774	18.7219	0.2420	5.7860	0.1681	199.1157	0.3310
Serum IgG	0.6423	0.3919	1.0527	0.0790	0.9202	0.5127	1.6518	0.7810
Respiratory IgA (nOD)	0.0816	0.0066	1.0024	0.0500	0.0328	0.0007	1.5839	0.0840
Respiratory IgA (titer)	0.9884	0.9755	1.0015	0.0840	0.9941	0.9791	1.0095	0.4510
leukocytes counts	1.0005	1.0001	1.0008	0.0110	1.0005	1.0001	1.0009	0.0260
neutrophil counts	1.0005	1.0001	1.0009	0.0140	1.0005	1.0001	1.0010	0.0280
lymphocyte counts	0.9954	0.9909	0.9999	0.0440	0.9969	0.9927	1.0011	0.1490
monocyte counts	1.0011	0.9971	1.0051	0.5910	1.0025	0.9976	1.0074	0.3220
platelete counts	0.9634	0.9279	1.0003	0.0520	0.9166	0.8179	1.0273	0.1340
ifna2	0.9999	0.9928	1.0070	0.9770	0.9992	0.9897	1.0088	0.8710
il1ra	1.0097	0.9997	1.0198	0.0570	1.0082	0.9985	1.0181	0.0990
il1a	1.0035	0.9906	1.0166	0.6000	1.0174	0.9961	1.0391	0.1110
il1b	0.8884	0.4967	1.5892	0.6900	0.9865	0.6976	1.3952	0.9390
tnfa	1.0061	0.9879	1.0246	0.5170	1.0082	0.9875	1.0294	0.4380
il6	1.0000	0.9984	1.0017	0.9720	1.0013	0.9991	1.0035	0.2490
il10	1.0126	1.0017	1.0236	0.0240	1.0106	0.9995	1.0219	0.0610
tgfb	0.8763	0.7695	0.9978	0.0460	0.8431	0.6945	1.0234	0.0840
fractalkine	1.0014	0.9997	1.0030	0.1110	1.0010	0.9991	1.0028	0.2980
mcp1	0.9999	0.9995	1.0004	0.8210	1.0001	0.9995	1.0006	0.8340
mcp3	0.9953	0.9814	1.0095	0.5150	0.9777	0.9352	1.0222	0.3210
ip10	1.0001	1.0000	1.0002	0.2260	1.0000	0.9999	1.0002	0.6460
mdc	0.9936	0.9862	1.0011	0.0960	0.9957	0.9873	1.0042	0.3170
rantes	0.8998	0.7977	1.0149	0.0860	0.8639	0.7451	1.0017	0.0530
il8	0.9994	0.9972	1.0017	0.6080	0.9998	0.9975	1.0021	0.8680
mip1a	0.9928	0.9645	1.0219	0.6220	0.9846	0.9380	1.0335	0.5300
mip1b	0.9906	0.9692	1.0124	0.3940	0.9986	0.9783	1.0193	0.8930
eotaxin	0.9987	0.9915	1.0059	0.7200	0.9993	0.9902	1.0084	0.8730
gro	0.9999	0.9997	1.0001	0.3250	0.9998	0.9995	1.0000	0.0910
il2	1.2349	0.6295	2.4227	0.5390	2.9259	0.9706	8.8201	0.0570
il7	0.9158	0.7004	1.1976	0.5210	0.7405	0.5081	1.0792	0.1180
il15	1.1464	1.0216	1.2865	0.0200	1.1312	0.9906	1.2917	0.0690
il12p70	0.0544	0.0002	14.6187	0.3080	0.0445	0.0002	8.0722	0.2410
ifng	0.9339	0.7912	1.1023	0.4190	0.9284	0.7560	1.1401	0.4780
il9	0.7857	0.1651	3.7388	0.7620	0.2067	0.0139	3.0788	0.2530
il17a	0.7218	0.3603	1.4460	0.3580	0.7958	0.4080	1.5523	0.5030
scd40l	0.9981	0.9960	1.0002	0.0830	0.9981	0.9959	1.0003	0.0940
gcsf	1.0029	1.0002	1.0057	0.0370	1.0024	0.9995	1.0052	0.1040
gmcsf	0.9762	0.8838	1.0781	0.6340	1.0032	0.9465	1.0632	0.9150
tgfa	1.0201	0.9468	1.0990	0.6010	1.0368	0.9605	1.1191	0.3540
egf	0.9633	0.9303	0.9974	0.0350	0.9652	0.9303	1.0014	0.0590
fgf2	0.9945	0.9751	1.0142	0.5810	0.9843	0.9627	1.0065	0.1640
vegf	0.9986	0.9947	1.0025	0.4820	0.9949	0.9890	1.0003	0.0880
.og.	0.5500	0.0011	1.0020	U. TUZU	0.0070	0.5050	1.0000	0.0000
p-value <0.05								
p-value <0.03								
P 10100 10.10								